

CLAIMS

1. A light emitting device comprising a semiconductor light emitting element and a phosphor which converts a part
5 of a luminescence spectrum emitted from the semiconductor light emitting element;

wherein said luminescence spectrum of said semiconductor light emitting element is located between a near ultraviolet region and a short-wavelength visible region,

10 wherein said phosphor is made by adding a red luminescent activator to a base material of a blue luminescent phosphor.

2. The light emitting device according to claim 1;

wherein the emission wavelength can be adjusted by the
15 added ratio of said red luminescent activator.

3. The light emitting device according to claims 1 or
2;

wherein said semiconductor light emitting element has a main peak wavelength more than 360nm in the ultraviolet
20 region.

4. A light emitting device comprising a semiconductor light emitting element and a phosphor which converts a part
of a luminescence spectrum emitted from the semiconductor light emitting element;

25 wherein said luminescence spectrum of said semiconductor

light emitting element is located between a near ultraviolet region and a short-wavelength visible region,

wherein said phosphor is an alkaline earth metal boric halide phosphor including at least one element represented by M selected from the group consisting of Mg, Ca, Ba, Sr and at least one element represented by M' selected from the group consisting of Mn, Fe, Cr, Sn.

5 5. The light emitting element according to claims 1 or 4;

10 wherein the light emitting layer of said semiconductor light emitting element is made of a nitride semiconductor including at least In and Ga.

6. The light emitting element according to claims 1 or 4;

15 wherein the light emitting layer of said semiconductor light emitting element is made of a nitride semiconductor including at least Ga and Al.

7. The light emitting element as in one of claims 4 to 6;

20 wherein said phosphor is an alkaline earth metal boric halide phosphor activated by at least Mn and Eu.

8. The light emitting element as in one of claims 4 to 7;

wherein said phosphor is represented by a general
25 formula of $(M_{1-x-y}Eu_xM'_y)_2B_5O_9M''$,

where M is at least one selected from the group consisting of Mg, Ca, Ba, Sr, M' is at least one selected from the group consisting of Mn, Fe, Cr, Sn, $0.0001 \leq x \leq 0.5$, $0.0001 \leq y \leq 0.5$, and M'' is at least one halogen selected from the group consisting of F, Cl, Br, I.

9. A light emitting device comprising;

a semiconductor light emitting element of which luminescence spectrum is located between a near ultraviolet region and a short-wavelength visible region,

10 a first phosphor which converts a part of a luminescence spectrum emitted from the semiconductor light emitting element, said first phosphor being made by adding an activator for red light emission to a base material of a blue emitting phosphor,

15 a second phosphor which can convert a part of the light emitted from the first phosphor to a light having a wavelength in a range from blue region to red region,

wherein a mixed light of the light emitted from the first phosphor and the light emitted from the second phosphor is outputted, said mixed light having a wavelength within a range of white region.

20 10. The light emitting device as in one of claims from 1 to 9; further comprising a phosphor selected from the group consisting of

25 an alkaline earth halogen apatite phosphor activated by

Eu, or Eu and Mn $[(\text{Sr}, \text{Ca}, \text{Ba}, \text{Mg}, \text{Zn})_5(\text{PO}_4)_3(\text{F}, \text{Cl}, \text{Br}, \text{I}):\text{Eu}, \text{Mn}]$,

an alkaline earth metal aluminate phosphor $[\text{SrAl}_2\text{O}_4:\text{Eu}, \text{Sr}_4\text{Al}_{14}\text{O}_{25}:\text{Eu}(\text{Mn}), \text{CaAl}_2\text{O}_4:\text{Eu}(\text{Mn}), \text{BaMg}_2\text{Al}_{16}\text{O}_{27}:\text{Eu},$
 5 $\text{BaMg}_2\text{Al}_{16}\text{O}_{12}:\text{Eu}, \text{Mn}, \text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}(\text{Mn})]$,

a phosphor of $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$ including nitride activated by Eu and/or Cr [oxynitride fluoroglass],

a phosphor of $\text{M}_x\text{Si}_y\text{N}_z:\text{Eu}$ (where M is at least one selected from the group consisting of Mg, CaBa, Sr, Zn,
 10 $z=2/3x+4/3y$),

an yttrium aluminate phosphor activated by cerium,

a rare earth acid sulfide phosphor activated by Eu $(\text{La}_2\text{O}_2\text{S}:\text{Eu}, \text{Y}_2\text{O}_2\text{S}:\text{Eu} \text{ and } \text{Gd}_2\text{O}_2\text{S}:\text{Eu})$,

an organic complex phosphor activated by Eu $[(\text{Sr}, \text{Ca}, \text{Ba}, \text{Mg})_5(\text{PO}_4)_3\text{Cl}:\text{Eu}, \text{ZnS}:\text{Cu}, \text{Zn}_2\text{GeO}_4:\text{Mn}, (\text{Sr}, \text{Ca}, \text{Ba}, \text{Mg})\text{Ga}_2\text{S}_4:\text{Eu}$
 15 and $(\text{Sr}, \text{Ca}, \text{Ba}, \text{Mg})_2\text{Si}_5\text{N}:\text{Eu}]$.